

September 28, 2017

Mr. Ryan Carter
Director of Construction
Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, California 92675

REFERENCE: **Limited Structural Assessment**
 Dana Hills High School
 33333 Golden Lantern
 Dana Point, CA 92629
 KNA No. 371.002

Dear Mr. Carter:

This report presents our findings, opinions and recommendations made in conjunction with our structural assessment at the Gymnasium and the Shower and Locker Buildings located at Dana Hills High School.

Our assessment was made on September 8, 2017 under fair and sunny weather conditions. Those present from the district included Mr. Ryan Carter, Director of Construction, Mr. Clark Hampton, Deputy Superintendent, and Mr. William Condon, Maintenance Supervisor. Our assessment was limited to visual observations and did not include destructive testing or other similar investigative procedures. Existing drawings dated June 17, 1970 (DSA A#32658) were made available to us prior to our assessment and were reviewed prior to us being on site.

BUILDING DESCRIPTION

The gymnasium space is part of a multi-building structure utilizing pre-stressed, precast tee beams spanning to cast in place and precast concrete walls (with integral concrete beams in the walls at the gymnasium space) and cast in place concrete columns supported on concrete caisson foundations. The pre-stressed, recast tee beams at the roof bear on the integral beams within the walls at steel bearing plates.

SUMMARY OF FINDINGS

Upon walking the low roof adjacent to the gymnasium, we noted prevalent spalling of the concrete at the ends of the roof tee beams. We noted two different mixes of concrete; a sand aggregate mortar and a 3/8" lightweight aggregate mix. We also noted the presence of corrosion on the reinforcing and tendons. Also visible was a formed surface where the joint between the lightweight concrete for the tee beam had a pocket to allow stressing of the steel

tendons. The sand aggregate mortar made up the cast in place end cap as noted on detail 12 of sheet ST-4 of the original drawings.

Typical tee beam tail with formed surface from original pocket visible:



Tee beam tail with ends of tendons exposed:



Lightweight aggregate and sand aggregate mortar visible (note ledge of integral beam that provides vertical bearing support for the tee beams):



Overall picture of tee beam ends showing integral beam that provides bearing support and all damage limited to the cantilever tails:



Interior span of the tee beams exhibited no signs of distress:



DISCUSSION

We have concluded that the sand aggregate mortar mix was not a quality mix nor was it well bonded to the lightweight concrete tee beam. It did not provide proper protection for the mild steel ties or the steel pre-stressing tendons, which have corroded in the area of the cap resulting in expansive forces that have spalled the concrete. We did not note damage to any of the tee beams in the bearing area at the integral concrete beam that provides support or that the interior spans of the beams. All damage was limited to the cantilever tails at the eave of the building.

RECOMMENDATIONS

As a first step, we recommend that the district authorize us to survey the site and identify any conditions that exist where falling debris could contact students or faculty in accordance with our discussions with the Division of the State Architect's San Diego office. We recommend the district provide barricades limiting path of travel in those areas until repairs are made. As a second step, we recommend that the district authorize us to perform a thorough survey of all tee beam ends on site and that we prepare a plan identifying every beam in need of repair details and specifications for the proper repair of the affected tee beams.

CONCLUSIONS

The condition of the tee beams has not compromised the original vertical and lateral load carrying capacity of the structure and their current condition does not preclude the building from continuing to house students and staff.

LIMITATIONS

We make no representation or warranties, neither expressed nor implied, as to the structural integrity of the subject facility. The professional assessment and opinions presented in this report have been developed using the degree of care and skill ordinarily exercised under similar circumstances by reputable consultants practicing in this or similar locations. Thank you for the opportunity to be of service. Please call should you have any questions or if we can be of further service.

Sincerely,

KNA STRUCTURAL ENGINEERS, INC.



Josh Randall, S.E.
Principal

